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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/061,836	01/31/2002	Michael D. Miller	10012063-1	9497

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EXAMINER

AHMED, SHAMIM

ART UNIT	PAPER NUMBER
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1765

DATE MAILED: 09/17/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/061,836

Applicant(s)

MILLER ET AL.

Examiner

Shamim Ahmed

Art Unit

1765

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 June 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 4,10-19 and 21-26 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 4,10-19,21-26 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☐ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 7/6/04.
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments with respect to claims 10-15,17-19, which was rejected under 102 (b) as being anticipated by Fujikawa (JP-11-198387) have been fully considered but they are moot in view of the new ground of rejection.

Applicant's arguments filed on 6/21/04, entered on 5/26/04 regarding the rejection of claim 21 over Sherman et al (6,312,612) is withdrawn as the arguments are persuasive.

Applicant's arguments with respect to claim 4 in view of Krut et al (5,391,236) have been fully considered and the rejection based on the Krut et al is withdrawn.

As to claim 4 in view of Miyata (6,113,225), applicants argue that Miyata teaches away from Fujikawa because Miyata et al forming a feature in a substrate by etching the feature with a single etch step.

Applicant's arguments is not persuasive because the two step etching of a substrate is already taught by the primary reference (Fujikama) and Miyata et al is introduced to show the teaching of etching a substrate in a depth in about half or 50% of the substrate by conducting half etching of the substrate with high accuracy (see the rejection).

As regards to Yasukawa et al (6,139,132), applicants argue that Yasukawa et al forming the nozzle communicating hole through the thickness of the substrate utilizing a single removal process.

In response, examiner states that the two step process is already taught by the primary reference (Fujikawa) and Yasukawa et al is introduced to show the maximum width of the communicating hole (43) is formed as small as possible, which is less than 50% of the total substrate thickness (figure 8) in order to passes the fluid or ink smoothly through the hole (col.8, lines 1-28).

Applicants also argue that the opening 43 has a sloped portion (43d) for smooth ink flows and has no relation with the width but with the length of the nozzle communication hole 43.

The argument is not persuasive because the sloped portion is an additional advantageous feature of the hole and directly relates with the width of the opening, which is small as possible and about less than half or 50% of the substrate thickness for smooth passes of the ink or fluid with out forming air bubble (see the rejection).

As regards to the Yagi et al (6,143,190), applicant's argument is persuasive and the rejection in view of Yagi et al is withdrawn.

As to the provisional double patenting rejection, the obviousness-type double patenting rejection (paragraph 11 of the previous office action) is still maintained but the 35 USC 102 (e)/103 (a) rejection over Rivas et al (application serial NO. 10/061,828) is withdrawn as applicant shows that the present application and Rivas et al are commonly owned by the same person or subject to an obligation of assignment to the same person.

Since, the claim 10 is amended to incorporate the limitation of having maximum slot width, a new ground of rejection applies as follows:

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fujikawa (JP-11-198387) in view of Miyata et al (6,113,225).

Fujikawa disclose a process of forming a slot in a print head substrate, wherein forming a trench (10) in a first surface of the substrate (1) opposite to a side subjected to an isotropic etching by sand blasting or dry etching or the like and a step of forming a second trench or opening by subjecting the substrate (lower surface) to anisotropic etching while penetrating the trench (10) in order to form the slot (see the abstract and figures 2a-2b and paragraph 0014 of the translated version).

Fujikawa also teach that the anisotropic etching could comprise a chemical dry etching (see paragraph 0041 of the translated version).

Fujikawa fail to teach that the dry etching removes about 50% of the thickness of the substrate.

However, in a method of making through-hole or slot, Miyata et al teach a process for forming an opening or trench having a depth that is about 50% or half of the substrate thickness by conducting half-etching the silicon substrate in order to form opening with high accuracy (col.11, lines 60-col.12, lines 14).

Therefore, it would have been obvious to one ordinary skilled in the art at the time of claimed invention to combine Miyata et al's teaching into Fujikawa's process for forming an opening having a depth of about half of the substrate thickness for forming an opening with high accuracy in order to increase the speed of jetting of ink as taught by Miyata et al.

5. Claims 10-15,17-19 and 21-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fujikawa (JP-11-198387) in view of Yasukawa et al (6,139,132).

As to claims 10 and 21, since the process steps are not in sequence, Fujikawa disclose a process of forming a slot in a print head substrate, wherein forming a trench (10) in a first surface of the substrate (1) opposite to a side subjected to an isotropic etching by sand blasting or dry etching or the like and a step of forming a second trench or opening by subjecting the substrate (lower surface) to anisotropic etching while

penetrating the trench (10) in order to form the slot (see the abstract and figures 2a-2b and paragraph 0014 of the translated version).

Fujikawa also teach that the anisotropic etching could comprise a chemical dry etching (see paragraph 0041 of the translated version).

Fujikawa fail to teach that the maximum width of the slot is less than or equal to 50% of the thickness of the substrate.

However, in a method of making through-hole or slot, Yasukawa et al teach that the maximum width of a slot (41) to be made as small as possible and the through-hole is formed for smoothly passing a fluid like ink and thereby, air bubbles is prevented (see col.8, lines 1-28).

Therefore, it would have been obvious to one ordinary skilled in the art at the time of claimed invention to combine Yasukawa et al's teaching into Fujikawa's process for reasonable expectation of success by reducing the maximum width of the slot for preventing stagnation of air bubbles from the ink/fluid during the ink flow as taught by Yasukawa et al.

As to claim 11, Fujikawa teaches that the step of removing is an anisotropic etching, which comprises chemical dry etching (see paragraph 0041).

As to claim 12, Fujikawa teaches that the trench 10 can be formed by dry etching before the anisotropic act of removing (claim 12) or act of creating in order to form the opening or slot through the entire substrate (claim 26) (see the abstract)

As to claim 13, Fujikawa teaches that the dry etching is actually performed several times and the amount of over etching is calculated, which is not larger than the previous etching (see paragraph 0037 of the translated version).

As to claims 14-15, Fujikawa teaches that the width of the second trench is less than 240 micrometers (microns), wherein the second trench is considered to be the trench 10, which is less than 50 percent of the substrate thickness, since the process steps are not in sequence in the instant application (see figures 2a-2b).

As to claim 17, since the process steps are not in sequence, Fujikawa teaches forming a second trench having a length that the breakthrough occurs at about 25-about 75 percent length of the first trench, wherein the second trench is considered to be the trench 10 (see figures 2a-2b).

As to claim 18, since the process steps are not in sequence, Fujikawa teaches that the first trench (anisotropic) has a depth of about 25-about 75 percent of the substrate thickness (see figure 2b).

As to claim 19, Fujikawa teaches the maximum width of the second trench (10) is 140 micrometers, which is less than 300 percent of the first trench formed by anisotropic etching (paragraph 0036 of the translated version and figure 2b).

As to claim 26, Fujikawa fails to teach that dry etching is performed before the act of sand drilling or sand blasting.

However, it would have been obvious to one skilled in the art at the time of claimed invention to rearrange the process sequence, since it has been held that the

transposition of process steps or the splitting of one step into two, where the processes are substantially identical or equivalent in terms of function, manner and result, was held to be not patentably distinguish the processes. *Ex parte Rubin* 128 USPQ 440 (PTO BdPatApp 1959).

Double Patenting

6. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

7. Claims 4, 10-19 and 21-23 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 16-17, 22-23, 28 and 34-37 of copending Application serial No. 10/061,828 (Publication No. US 2003/0140497 A1).

Claims 4, 10-19 and 21-23 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 16-17, 22-23, 28 and 34-37 of copending Application No. 10/061,828. Although the conflicting claims are not identical, they are not patentably distinct from each other because the

instant application differs from the co-pending application (10/061,828) is that the first trench is created with a laser machining.

However, it would have been obvious the dry etching includes the laser etching or drilling because laser machining is a kind of dry etching.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Conclusion

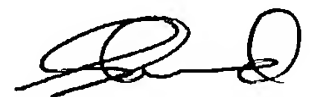
8. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shamim Ahmed whose telephone number is (571) 272-1457. The examiner can normally be reached on M-Thu (7:00-5:30) Every Friday Off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nadine G Norton can be reached on (571) 272-1465. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Shamim Ahmed
Examiner
Art Unit 1765

SA
September 12, 2004